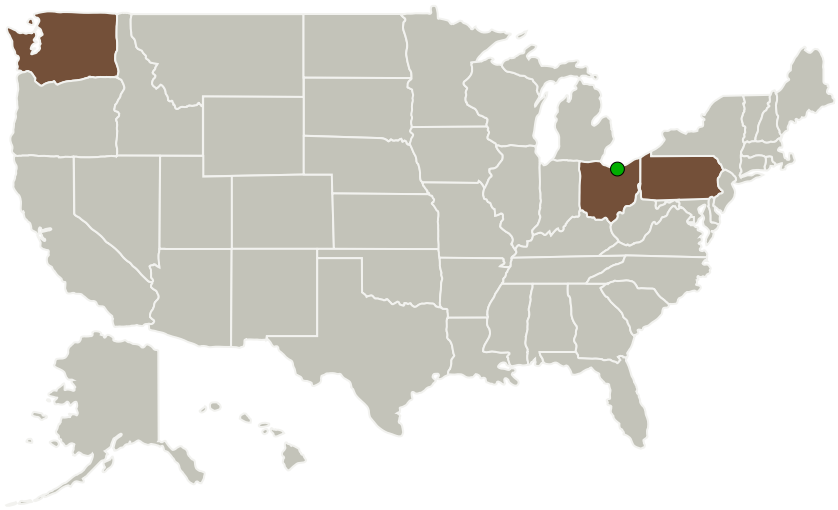
Advanced Stirling Regenerator and Heat Exchanger Assembly for Radioisotope Stirling Space Power, Phase I

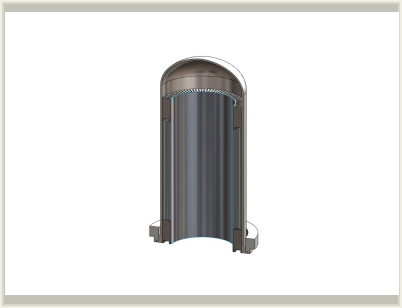
Completed Technology Project (2016 - 2017)

Project Introduction

SCCAQ Energy, LLC (SCCAQ), in collaboration with Temple University and Infinia Technology Corporation, proposes to develop an Advanced Stirling Regenerator and Heat Exchanger Assembly to significantly increase the performance and durability of Stirling Power systems to address the need for an efficient and robust Radioisotope Power System for space applications. This assembly will be used to replace the heat exchangers and random fiber regenerator of Technology Demonstration Convertor developed by Infinia Corporation in 1999 to 2006. Proposed Principal Investigator, Dr. Songgang Qiu, was at that time PI and the principal designer for the Infinia Stirling Radioisotope Generator program, under which the TDC was developed. Dr. Qiu was co-PI for the micro-machined involute regenerator project under a NASA GRC contract. The integrated regenerator/heat exchanger assembly will be additively manufactured to increase the efficiency and durability, while reducing the size and weight. The major innovation is additively manufacturing the assembly to have outstanding figure of merit comparable to foil regenerator while improves reliability, better than mesh screen regenerator. The integrated assembly of heat exchangers and regenerator will provide uniform flow throughout the key components to minimize flow separation and flow losses in the plenums and to avoid jetting in the regenerator.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
SCCAQ Energy, LLC	Lead Organization	Industry Minority-Owned Business, Women-Owned Small Business (WOSB)	Richland, Washington
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
Temple University	Supporting Organization	Academia	Philadelphia, Pennsylvania

Primary U.S. Work Locations	
Ohio	Pennsylvania
Washington	

Images

Briefing Chart Image
Advanced Stirling Regenerator and Heat Exchanger Assembly for Radioisotope Stirling Space Power, Phase I
(https://techport.nasa.gov/image/128423)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
SCCAQ Energy, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

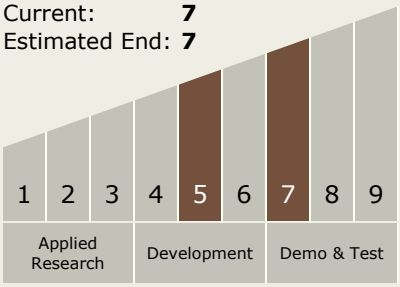
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Songgang Qiu

Technology Maturity (TRL)

Start: **5**
Current: **7**
Estimated End: **7**



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Completed Technology Project (2016 - 2017)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System